

IN THE CLAIMS:

Amend claims 1, 6, 11, 14, 15, 16 and 18 and add the following new claims 27-30 as shown in the following listing of claims, which replaces all previous versions and listings of claims.

1. (currently amended) A fingerprint reading device comprising:

an active matrix liquid crystal cell having a front surface ~~facing a user~~ and a rear surface opposing the front surface;

an illumination source for projecting a light from the rear surface to the front surface of the active matrix liquid crystal cell;

a light guiding plate on the front surface of the active matrix liquid crystal cell for transmitting the light projected ~~from the rear surface of~~ through the active matrix liquid crystal cell and deflecting to a person's finger in contact with a front surface of the light guiding plate and reflecting light reflected from the finger on a rear surface of the light guiding plate toward a side end surface of the light guiding plate; ~~light that enters the light guiding plate from a front surface thereof and is directed toward the rear surface;~~

light receiving means on the side end surface of the light guiding plate for receiving the deflected reflected light exiting from the side end surface of the light guiding plate; and

a drive circuit for driving the active matrix liquid crystal cell to pinpoint-irradiate a fingerprint of the finger in contact with the light guiding plate by pinpointing with the light emitted from the illumination source and causing the light receiving means to pinpoint-receive the light reflected by the fingerprint to thereby obtain an image of the fingerprint.

2. (previously presented) A fingerprint reading device according to claim 1; wherein the active matrix liquid crystal cell comprises a liquid crystal cell of a liquid crystal display device.

3. (previously presented) A fingerprint reading device according to claim 1; wherein the active matrix liquid crystal cell is provided in superposition on at least a part of a liquid crystal cell of a liquid crystal display device.

4. (previously presented) A fingerprint reading device according to claim 1; wherein the light receiving means comprises a line sensor provided along the side end surface of the light guiding plate.

5. (previously presented) A fingerprint reading device according to claim 1; wherein the light receiving means comprises a light receiving element and one of a lens or a lens array for converging on the light receiving element the light exiting from the side end surface of the light guiding plate.

6. (currently amended) A fingerprint reading method comprising the steps of:

providing an active matrix liquid crystal cell;

providing illuminating means for projecting light from a rear surface of the active matrix liquid crystal cell;

providing a light guiding plate on a front surface of the active matrix liquid crystal cell opposite the rear surface for receiving the light coming from the rear surface and reflecting on a rear surface of the light guiding plate ~~reflecting~~ toward a side end surface of the light guiding plate light that enters the light guiding plate from a front surface thereof and that is directed toward the rear surface;

selectively pinpoint-irradiating a fingerprint finger touching a front surface of the light guiding plate through the active matrix liquid crystal cell with the light projected from the rear surface of the active matrix liquid crystal cell;

receiving the light reflected by the fingerprint finger and reflected from the rear surface of the light

guiding plate and exiting from the side end surface of the light guiding plate; and

using the received light reflected by the fingerprint finger to obtain an image of the a fingerprint of the finger.

7. (previously presented) A fingerprint reading device according to claim 1; wherein the active matrix liquid crystal cell has a matrix of transparent electrodes driven by thin film switching elements.

8. (previously presented) A fingerprint reading device according to claim 7; wherein the thin film switching elements comprise one of thin film transistors, insulated gate field effect transistors, and thin film diodes.

9. (previously presented) A fingerprint reading device according to claim 1; wherein the active matrix liquid crystal cell has a resolution of about 300 dpi and a pitch between adjacent pixels of about 50 μm .

10. (previously presented) A fingerprint reading device according to claim 1; wherein the side end surface of the light guiding plate is disposed at a right angle with respect to the front and rear surfaces of the active matrix liquid crystal cell.

11. (currently amended) A fingerprint reading device comprising: a liquid crystal cell having a plurality of separately addressable pixels, a front surface ~~facing a user~~ and a rear surface opposite the front surface; an illumination device for projecting light from behind the rear surface through the front surface of the liquid crystal cell to illuminate a finger placed over the front surface; a light guiding plate having opposed front and rear surfaces and a side end surface, the light guiding plate being disposed over the liquid crystal cell with the rear surface of the light guiding plate facing the front surface of the liquid crystal cell so that light projected through the liquid crystal cell is transmitted through the light guiding plate and illuminates a person's finger in contact with the front surface of the light guiding plate and light reflected from the finger is transmitted into the light guiding plate and reflected from the rear surface thereof toward the side end surface; a light receiving device for receiving the reflected light exiting from the side end surface of the light guiding plate light reflected by the finger; and a drive circuit for sequentially driving the respective pixels of the liquid crystal cell to project light from the illumination device onto the finger so that an image of a fingerprint of the finger can be obtained based on the reflected light; and a light guiding plate

~~disposed over the front surface of the liquid crystal cell for transmitting the light projected from the rear surface of the liquid crystal cell and deflecting toward a side end surface of the light guiding plate light that enters the light guiding plate from a front surface thereof and is directed toward the rear surface.~~

12. (previously presented) A fingerprint reading device according to claim 11; wherein the liquid crystal cell comprises an active matrix liquid crystal cell.

13. (canceled).

14. (currently amended) A fingerprint reading device according to claim 11; wherein the light receiving device is disposed adjacent to the side end surface of the light guiding plate for receiving the deflected reflected light.

15. (currently amended) A fingerprint reading device according to claim 11; wherein the light receiving device comprises a light receiving element and one of a lens and a lens array for converging on the light receiving element the reflected light exiting from the side end surface of the light guiding plate.

16. (currently amended) A fingerprint reading device according to claim 15; wherein the drive circuit controls the liquid crystal cell by sequentially activating respective pixels thereof so that the light emitted by the illumination device is irradiated onto the finger fingerprint pixel-by-pixel and light reflected by the finger fingerprint is received by the light receiving device so that an image of the finger fingerprint can be obtained.

17. (previously presented) A fingerprint reading device according to claim 11; wherein the light receiving device comprises a line sensor provided along the side end surface of the light guiding plate.

18. (currently amended) A fingerprint reading device according to claim 11; wherein the opposed front and rear surfaces light receiving device comprises a light receiving element and one of a lens or a lens array for converging on the light receiving element the light exiting from the side end surface of the light guiding plate are parallel to one another.

19. (previously presented) A fingerprint reading device according to claim 11; wherein the side end surface of the light guiding plate is disposed at a right angle with respect to the front and rear surfaces of the liquid crystal cell.

20. (previously presented) A fingerprint reading device according to claim 11; wherein the liquid crystal cell comprises a liquid crystal cell of a liquid crystal display device.

21. (previously presented) A fingerprint reading device according to claim 11; wherein the active matrix liquid crystal cell comprises a first transparent substrate, a second transparent substrate, a spacer joining the first and second transparent substrates so that a gap is formed therebetween, a layer of liquid crystal material filled in the gap, and a plurality of pixel elements arranged in a matrix for altering the light transmission characteristics of the liquid crystal material.

22. (previously presented) A fingerprint reading device according to claim 21; wherein the pixel elements comprise a transparent electrode and an active switching element formed on one of the transparent substrates facing the liquid crystal material layer.

23. (previously presented) A fingerprint reading device according to claim 11; wherein the active matrix liquid crystal cell is superimposed on a liquid crystal cell of a liquid crystal display device.

24. (previously presented) A fingerprint reading device according to claim 11; wherein the liquid crystal cell has a matrix of transparent electrodes driven by thin film switching elements.

25. (previously presented) A fingerprint reading device according to claim 24; wherein the thin film switching elements comprise one of thin film transistors, insulated gate field effect transistors, and thin film diodes.

26. (previously presented) A fingerprint reading device according to claim 11; wherein the liquid crystal cell has a resolution of about 300 dpi and a pitch between adjacent pixels of about 50 μm .

27. (new) A fingerprint reading method comprising the steps of:

providing a liquid crystal cell;

providing a light guiding plate on a front surface of the liquid crystal cell;

selectively pinpoint-irradiating a finger touching a front surface of the light guiding plate by projecting light in a first direction serially through the liquid crystal cell and the light guiding plate;

using the light guiding plate to guide light reflected by the finger in a second direction generally

transverse to the first direction by reflecting the reflected light from a rear surface of the light guiding plate toward a side end surface thereof; and

using the reflected light exiting from the side end surface of the light guiding plate to obtain an image of a fingerprint of the finger.

28. (new) A fingerprint reading method according to claim 27; wherein the step of providing a light guiding plate comprises providing a light guiding plate having parallel opposed front and rear surfaces with the rear surface thereof disposed on the front surface of the liquid crystal cell.

29. (new) A fingerprint reading method according to claim 28; wherein the side end surface of the light guiding plate is disposed at a right angle with respect to the front and rear surfaces of the liquid crystal cell.

30. (new) A fingerprint reading method according to claim 27; wherein the side end surface of the light guiding plate is disposed at a right angle with respect to the front and rear surfaces of the liquid crystal cell.